Remarks

Applicant respectfully requests reconsideration of this application as amended.

Claims 1, 3-5, 14, 18, 21, 33, 43, 45, 51, and 58 have been amended. Claims 2, 27, 28, and

59 have been cancelled. No claims have been added. Therefore, claims 1, 3-8, 10-12, 14-15,

18, 20-22, 24-25, 30-31, 33-34, 37-38, 40-41, 43-46, 48-49, 51-52, 55-56, 58, and 60-62 are

presented for examination.

35 U.S.C. §103(a) Rejection

Claim 1 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Athitsos

et al. "Distinguishing Photographs and Graphics on the World Wide Web," IEEE 1997.

Applicant submits that the present claim is patentable over Athitsos.

Athitsos discloses an automated system that distinguishes photographs and graphics

on the World Wide Web. Recognition tests are originated from statistical observations about

the differences between computer-generated graphics and photographs that appear on the

Web. Based on these observations, Athitsos creates image metrics, which are functions

based on images. The image metrics are expressed in terms of real numbers, known as

"metric scores". In order to achieve high recognition accuracy, Athitsos combines scores

from several metrics.

Furthermore, the Athitsos system uses learning to create decision trees, which specify

how to combine the various metric scores of an image in order to classify it (Athitsos, page

11, col.1, lines 2-9, lines 13-19). Athitsos observes that graphics tend to have fewer colors

than photographs. The score of the image for the prevalent color metric is the fraction of

pixels that have that color. Photographs contain noise that causes even nearby pixels to have

different colors (RGB values) (Athitsos, page 11, col. 2, lines 4-8), resulting in a lower color metric score for photographs as compared to graphics.

Claim 1, as amended, recites:

> A method to train image classification,
> comprising:
> measuring noise in a first image;
> generating a noise-reduced second image from the first image;
> aggregating the difference between the first image and the second image into a noise feature vector; and
> training a classification model from the noise feature vector to classify a third image as a natural image versus an artificial image from noise in the third image.

Applicant submits that Athitsos does not disclose or suggest generating a noise-reduced second from a first image and aggregating the difference between the first and second images into a noise feature vector. The Office Action acknowledges as much when it states that "Athitsos...fails to disclose generating of noise reduced third image by subtraction of two images." (Office Action mailed 2/4/2004 at page 3, point 4.) Therefore, claim 1 is patentable over Athitsos.

Claims 3-6 depend from claim 1 and include additional limitations. Therefore, claims 3-6 are also patentable over Athitsos.

Claims 2-6 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Athitsos et al. in view of Zhang et al. (U.S. Patent No. 5,491,627). Claim 2 has been cancelled. However, Applicant submits that Zhang does not disclose or suggest the features of claim 1 of generating a noise-reduced second image from a first image, aggregating the

difference between a first image and a noise-reduced second image into a noise feature vector, and training a classification model based on the noise feature vector.

Zhang discloses the detection of microcalcifications in digital mammograms. First, regions-of-interest (ROIs) are selected from digital mammograms using a well-known computer-aided diagnosis device (CAD). Then the ROIs are background trend corrected, optionally Fourier-transformed into the frequency domain, and then scaled for input into a neural network trained to detect microcalcifications. (Zhang at Abstract).

The Office Action cites col. 5, lines 9-20 of Zhang as disclosing the generation of noise reduced images by subtracting two images. (Office Action at pages 3-4, point 4). This portion of Zhang refers to a well-known CAD device for initial selection of ROI from digital mammogram. This device, described in detail in U.S. Patent No. 4,907,156 by Doi et al. (hereafter "Doi"), processes a digital X-ray image to obtain signal-enhanced image data with a maximum signal-to-noise ratio, and signal-suppressed image data with a suppressed signal-to-noise ratio. Then, the device forms a difference image by subtraction of the signal-suppressed image from the signal-enhanced image to remove anatomic structured background and to enhance the visibility of regions-of-interest.

This difference image is input to a feature extraction device that merely extracts the features characterizing abnormal anatomic regions, such as circularity and size, *and does not extract noise as a feature*. (Doi, col.3, lines 33-35). Therefore, Zhang does not disclose or suggest generating a noise-reduced second image from a first image, as recited in claim 1. Furthermore, applicant can find no disclosure or suggestion in Zhang of generating a noise feature vector from the difference between two images, and training a classification model based on this noise feature vector.

Therefore, the features of claim 1, namely generating a noise-reduced second image from a first image, aggregating the difference between a first image and a noise-reduced second image into a noise feature vector, and training a classification model based on the noise feature vector, are neither disclosed nor suggested by Zhang. As discussed above, Athitsos does not disclose or suggest generating a noise-reduced second from a first image. As such, neither Athitsos nor Zhang, individually or in combination, disclose or suggest the features of claim 1. Therefore, claim 1 is patentable over Athitsos in view of Zhang. Claims 3-6 depend from claim 1 and include additional limitations. Hence, claims 3-6 are also patentable over Athitsos in view of Zhang.

Claims 7-8, 10-12, 14-15, 18, 20-22, 24-25, 27-28, 30-31, 33-34, 37-38, 40-41, 43-46, 48-49, 51-52, 55-56, and 58-62 stand rejected for the same reasons as set forth in the rejection of claims 1-6 as these claims contain similar subject matter as claims 1-6.

Independent claims 14, 18, 21, 33, 43, 45, 51, and 58 include similar features as claim 1, and as a result are also patentable over Athitsos in view of Zhang for the reasons discussed above. Claims 15, 20, 22, 34, 44, 46, 52, and 60-62 depend from claims 14, 18, 21, 33, 43, 45, 51, and 58, respectively, and include additional limitations. Therefore, claims 15, 20, 22, 34, 44, 46, 52, and 60-62 are also patentable over Athitsos in view of Zhang.

Claim 7 recites training a classification model from a feature vector, the feature vector including at least one feature of an image selected from the group of at least one text block feature, at least one edge-location feature, and at least one aspect ratio of an image. Athitsos' method distinguishes photographs from graphics by using a number of metrics. Zhang uses features to select the ROIs on the X-ray images. However, Athitsos and Zhang,

taken alone or in combination, do not teach or suggest distinguishing *a slide image from a comic image* by generating the feature vector that comprises at least one feature of an image selected from the group consisting of at least one text block feature of the image, at least one edge-location feature of the image, and at least one aspect ratio of the image.

Claims 8 and 10 depend from claim 7 and include additional limitations. Therefore, claims 8 and 10 are also patentable over Athitsos in view of Zhang.

Independent claims 11, 24, 30, 37, 40, 48, and 55, and their corresponding dependent claims 10, 12, 25, 31, 38, 41, 49, and 56, include similar features as claim 7. Thus, for the reasons discussed above with respect to claim 7, Applicant respectfully submits that claims 11, 24, 30, 37, 40, 48, and 55 and their corresponding dependent claims, 12, 25, 31, 38, 41, 49, and 56, are also patentable over Athitsos in view of Zhang.

Applicant respectfully submits that the rejections have been overcome and that the claims are in condition for allowance. Accordingly, applicant respectfully requests the rejections be withdrawn and the claims be allowed.

The Examiner is requested to call the undersigned at (303) 740-1980 if there remains any issue with allowance of the case.
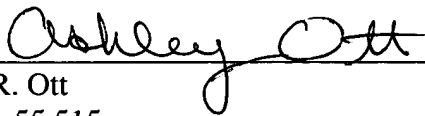
Applicant respectfully petitions for an extension of time to respond to the outstanding Office Action pursuant to 37 C.F.R. § 1.136(a) should one be necessary. Please charge our Deposit Account No. 02-2666 to cover the necessary fee under 37 C.F.R. § 1.17(a) for such an extension.

Please charge any shortage to our Deposit Account No. 02-2666.

Respectfully submitted,

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Date: May 4, 2005

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